

Association of Medical Commissions as delegate to the meeting of the Association of the American Milk Commissions, held at Philadelphia in June, 1911.

M. E. JAFFA, Secretary.

### REGULATIONS GOVERNING THE MANUFACTURE OF CERTIFIED BUTTER.

1. No factory under certification shall produce butter of a lower grade than certified.

2. Every factory desiring certification shall make application to the secretary of a medical milk commission, giving in detail the sources of its cream or milk supply with the number of cows in each herd, and shall deposit in cash or certified check a sum sufficient to cover a tuberculin test of each cow in each herd by the medical milk commission's expert at one dollar per head.

(a) No herd showing 10% of reactions shall deliver cream or milk to a certified butter factory.

(b) No refund shall be made on account of a herd failing to reach the required standard.

(c) Every animal reacting to the tuberculin test shall be immediately removed from the premises.

(d) All additions to herds shall be made in accordance with the requirements for certified milk.

(e) A semi-annual tuberculin test of all animals used in the production of cream shall be made by the commission's expert.

3. All premises producing cream, or manufacturing certified butter, shall be inspected by a committee of not less than two, from the medical milk commission before certification.

(a) The necessary traveling expenses of such committee shall be deposited with the secretary of the medical milk commission at the time of making application.

4. The management of the herd, the construction of stables, milk houses and butter factories shall comply with all the sanitary requirements adopted for the production of certified milk.

5. The sterilization of all utensils and implements used in the handling of milk and cream and the manufacture of certified butter shall correspond with similar rules for certified milk.

6. The starter shall be made from milk produced under these regulations. The milk shall be pasteurized twice at intervals of 24 hours, at 180° F. After pasteurizing, cool to 80° F. and add any good commercial dry lactic ferment, keep at 75° F. for 15-20 hours.

For the second propagation, pasteurize the starter milk at 180° F. for 20 minutes, cool to 70° F. and add another starter. Acidity of starter shall not exceed .7% after coagulation.

7. A medical examination of all persons concerned in the production, handling or manufacturing of milk, cream and certified butter shall be made by a member of the medical milk commission before certification.

(a) Monthly medical inspections shall be made after certification.

(b) The presence of an infectious disease on the farm, or in the factory, shall be cause for withdrawal or suspension of certification.

8. No cream shall be more than 24 hours old when delivered to the factory.

(a) It shall not be accepted by the factory if it contains more acid in 50 c. c. than will be neutralized by 13 c. c. of N/10 alkali solution as determined by Mann's Acid Test.

9. No pasteurized cream shall be used in the manufacture of certified butter.

10. Milk shall be removed from the stable as soon as drawn, run through a separator and immediately cooled to 50° F. and held at this temperature until delivered to the factory.

(a) If no farm separator is used, the milk shall be cooled to 50° F. as soon as drawn and held at 50° F. until delivered to the factory.

(b) Separator "slime" shall not be added to the cream.

11. Certified butter shall contain not less than 82% of milk fat and not more than 14% of moisture. If coloring matter is used the label must so state.

(a) It must score not less than 95 commercially.

(b) It must be full weight, wrapped in paper and sealed in a carton, which must bear the maker's name, the date of manufacture, and weight.

(c) The seal of the commission shall be affixed to the carton.

(d) The carton shall be submitted to the commission for approval before using.

12. Bacterial examinations of cream shall be made monthly, or oftener if considered necessary by the commission.

(a) Cream shall not contain more bacteria per c. c. than the standard of A. A. M. C. for certified cream, or if they have no standard, adopt B. A. I. score for perfect cream.

(b) A chemical examination of butter shall be made at least semi-monthly.

13. The butter factory shall be responsible to the commission for the carrying out of all regulations applying to the production of cream, and shall bear all expenses connected with certification.

14. Expense of maintaining certification shall be:

(a) Monthly inspection of butter factory and all dairies supplying cream, by the commission's expert, \$10 per day and expenses.

(b) Additional inspections when required by conditions.

(c) \$3 for each bacterial examination of cream.

(d) \$2.50 for each chemical examination of butter.

(e) \$1.25 per thousand for the commission's certificates, one of which shall be used on each carton of butter produced.

It is the sense of this meeting of the State Association of Medical Milk Commissions that the regulations for the production of dairy products, other than milk or butter, certified to by a medical milk commission, shall conform to those adopted for the production of certified milk and butter.

Adopted by California Association of Medical Milk Commissions, Santa Barbara, April 18, 1911.

### A HISTORY OF THE CONTROL OF TUBERCULOSIS IN THREE CALIFORNIA DAIRIES.

By C. M. HARING, D. V. M.

In the control of tuberculosis in dairy cattle we have a problem concerning which there is much to learn. Believing that a review of the efforts to keep tuberculosis out of certain California dairies would be of considerable educational value to dairymen, veterinarians and others interested in dairy sanitation, and be of especial interest to those attending this meeting, I have endeavored to recall the incidents connected with my work in certain dairies, and have made a study of the data concerning these dairies and of their tuberculin test records on file at the University. These are of tuberculin tests made by Dr. Ward, Dr. Roadhouse and myself, or by University students working under our supervision.

#### DAIRY NO. 1.

The cattle in this dairy were tested with tuberculin for the first time January 5th, 1905. The results of this test, and those subsequently made, are shown in table number 1. The number of cows that were tested was 77, of which 14 were condemned because of a reaction to tuberculin, the per-

centage of reactors being 18. The reacting animals were all removed to another dairy, and the cow stable disinfected. In 1906 tuberculin tests were made on two dates, about half of the herd being tested on each date. The results are as follows:

March 12th: Number of cows tested, 62; number of reactors, 2; percentage of reactors, 3.

September 29th: Number of cows tested, 83; number of reactors, 6; percentage of reactors, 7.

Between the dates of the last test mentioned above and the first test on January 5th, 1905, 130 cows had been added to the herd from herds showing an average of 27 per cent. reactors. During the twelve months following this 13 cows were purchased for the herd from herds showing an average of 50 per cent. reactors, and on the regular annual test, September 14th, 1907, 144 cows were tested, 32 of which were condemned, the percentage of reactors being 22. During the next year 21 cows were purchased from herds showing 19 per cent. reactors, and on January 29th, 1908, 130 cows were tested, 22 of which were condemned, the percentage of reactors being 17. During the next year 18 cows were purchased from miscellaneous sources, only one cow reacting, which is not included in the 18 above mentioned. At the next semi-annual, August 12th, 1908, 128 cows were tested, 4 of which were condemned, the percentage of reactors being 3. It will be noted from the table that at this time the practice of testing the entire herd every six months instead of every twelve months was adopted.

The next year's purchases were very reckless. On November 26th, 1908, a herd of 43 cows were tested for purchase, 10 of these were passed, and 33 condemned because of their reaction to tuberculin. Of the animals which passed several were added to the tested herd. The records do not show just how many. I personally recollect making this test. I knew that a large number of reactors would be found because the year previous I had been called to render professional services at this dairy. In the month previous to the time when I was called four cows had died from an unknown disease which had been causing occasional losses for some time. On a physical examination of the herd I decided that bovine tuberculosis was causing the loss, and my diagnosis was verified by an autopsy performed on one of the most emaciated cases. The owner undertook to tuberculin test the herd himself and at the time of the purchase by Dairy No. 1 he had weeded out most of the advanced cases which showed physical symptoms. On March 3d, 1909, another reckless purchase was made of 60 cows, 53 of which were condemned by tuberculin test, 4 others showed suspicious rise in temperature, and three passed. These 3 were added to the clean herd.

The next semi-annual test performed in 1909 showed only 2 per cent. of reactors, the number of cows tested being 125, number condemned being 2. Purchases between this date and January 30th, 1910, were 53 animals from herds showing  $5\frac{1}{2}$  per cent. of reaction. On January 30th, 1910, 114 cows were tested, 7 of which reacted, the percentage of reactors being 6. In all to June, 1910, 432 cows had been tested for purchase, 84 of which

reacted, the percentage of reactors being 24. Since that time the animals have been purchased from herds showing 3 per cent. or less of reaction. Figures of these purchases are shown in the tables.

To summarize the tuberculin test of this dairy:

Total number of cattle tested 506, total number condemned 184, per cent. condemned 36+, total number of tests including retests 1509.

#### DAIRY NO. 2.

Cattle in this dairy were tested with tuberculin for the first time in February, 1908. Number of cows that were tested was 196, of which 110 were condemned because of a reaction or on account of physical symptoms, the percentage of reactors being 56. I will not take the time to describe in detail the results of each tuberculin test. They are summarized in the following table. However, I would like to point out the significance of some of the figures. You will note the high percentage of reactors at the original test mentioned above and it is probable that there were a number of tuberculous animals left in the herd which were not detected by this test. The result is that at subsequent tests the percentage of reactors has been quite high. This was enhanced by purchases from extremely tuberculous herds. One instance of such a purchase occurred in August, 1908. A buyer from this dairy went to a large dairy in South San Francisco containing over 400 cows. He selected 47 cows which appeared to him to be in good physical condition. These were tested by a representative from the University and all but 8 reacted to tuberculin, or showed such a high initial temperature that it was deemed inadvisable to inject them. The 8 which passed the test were purchased and added to herd No. 2. At the following semi-annual test three of these reacted. They were purchased together with some other reacting animals and taken to the University Farm, at Davis. On June 3, 1909, they were tested with tuberculin, using a dose of 3 cc. of University of California tuberculin and none of them reacted. On July 4th of the same year they were tested with 4 cc. of Bureau of Animal Industry tuberculin. Two of them showed a rise of temperature but the curve was not typical of a tuberculin reaction. On autopsy, these animals proved to have tuberculosis; however, in only one of these were the lesions so advanced that their failure to react could be attributed to that cause. It is a well known fact that animals which have reacted to tuberculin will occasionally fail to react with subsequent tests, even when this subsequent test is made after an interval of six months.

To summarize the tuberculin tests of this dairy:

Total number of cattle tested 595, total number condemned 332, per cent. condemned 55, total number of tests including retests 1414.

#### DAIRY NO. 3.

The owner of this dairy has been more careful or perhaps more fortunate in purchasing cows, and as can be seen by the table the number of reacting cattle found in this dairy is comparatively small. At the first tuberculin test, 12 animals out of 70 reacted. These 12 reacting cows had all been purchased at one dairy in the neighborhood. If you

will inspect the other tests up to and including June, 1910, you will note that up to that time 32 cattle had reacted, including the 5 condemned on purchase. Of these 28 can be traced directly to the infected dairy, mentioned above, from which purchases were made.

The four cows condemned in November, 1909, did not show typical reactions, merely a suspicious rise, and there is doubt as to whether they were tubercular, however they have been included in the totals.

The totals shown in the table indicate that in all the number of individual cattle tested at this dairy was 593, total number condemned 46, total per cent. of condemned 7, total number of tests including retests 1059.

Table Showing the Results of Frequent Tuberculin Tests in Three Dairies.

DAIRY NO. 1.			
	No. of cows tested.	No. Condemned.	Per cent.
January 5, 1905.....	77	14	18+
March 12, 1906.....	62	2	3+
September 29, 1906.....	83	6	7+
September 14, 1907.....	144	32	22+
January 29, 1908.....	130	22	17-
August 12, 1908.....	128	4	3+
April and September, 1909.....	125	2	2-
January 30, 1910.....	114	7	6+
August 1, 1910.....	99	4	4-
March 21, 1911.....	118	4	3+
Purchases to June, 1910.....	342	84	24½
Purchases since June, 1910.....	87	3	3+
Total number of cattle tested.....	506		
Total number condemned.....	184		
Per cent. condemned.....			36 2-3
Total number of tests, including retests.....	1509		

DAIRY NO. 2.			
	No. of cows tested.	No. Condemned.	Per cent.
February, 1908.....	196	110	56+
February, 1909.....	189	13	7-
November, 1909.....	176	37	21+
June, 1910.....	246	18	7+
February 15, 1911.....	208	19	9+
Purchases to June, 1910.....	385	135	35+
Purchases since June, 1910.....	14	...	...
Total number of cows tested.....	595		
Total number condemned.....	332		
Per cent. condemned.....			55+
Total number of tests, including retests.....	1414		

DAIRY NO. 3.			
	No. of cows tested.	No. Condemned.	Per cent.
November, 1908.....	70	12	17+
April, 1909.....	57	9	15+
November, 1909.....	73	4	5+
May, 1910.....	138	2	1+
November, 1910.....	198	6	3+
Purchases to June, 1910.....	203	5	2+
Purchases since June, 1910.....	320	8	2½
Total number of cows tested.....	593		
Total number condemned.....	46		
Per cent. condemned.....			7+
Total number of tests, including retests.....	1059		

The totals shown in the above tables speak for themselves. They furnish an object lesson showing the prevalence of bovine tuberculosis in the dairy cows of the San Francisco Bay region. If we select out the tests made on animals being tested for the first time in their lives we find they number 1694, of which 371 reacted, the reactions being 21.9%. This indicates the prevalence of tuberculosis in the dairy herds from which dairies 1, 2 and 3 were recruited, and when taken in connection with the figures of numerous other tests made in San Francisco Bay region and in Central California, shows that they represent about the percent. of reacting cows in the dairies of that part of the country.\*

\* Ward and Haring. Bulletin 199, Agricultural Experiment Station, Berkeley, California, August, 1908.

#### THE ACCURACY OF THE TUBERCULIN TEST.

The data in the above tables is worthy of study because of the light thrown on the value of the use of tuberculin in the diagnosis of bovine tuberculosis in cattle. Those who are not familiar with the technic of the use of tuberculin by veterinarians I refer to Bulletin 199, of the Agricultural Experiment Station, which can be obtained by writing to the director of the above station, at Berkeley, Cal. As a brief explanation concerning the accuracy of the tuberculin test, I will quote Resolution II from the Report for 1910, of the International Commission on the Control of Bovine Tuberculosis, appointed by the American Veterinary Medical Association:

#### Resolution 2—Tuberculin Test:

1. That tuberculin, properly used, is an accurate and reliable diagnostic agent for the detection of active tuberculosis.

2. That tuberculin may not produce a reaction under the following conditions:

- (a) When the disease is in a period of incubation.
- (b) When the progress of the disease is arrested.
- (c) When the disease is extremely generalized.

The last condition is relatively rare and may usually be detected by physical examination.

3. On account of the period of incubation and the fact that arrested cases may sooner or later become active, all exposed animals should be retested at intervals of six months to one year.

4. That the tuberculin test should not be applied to any animal having a temperature higher than normal.

5. That any animal having given one distinct reaction to tuberculin should thereafter be regarded as tuberculous.

6. That the subcutaneous injection of tuberculin is the only method of using tuberculin for the detection of tuberculosis in cattle which can be recommended at the present time.

7. That tuberculin has no injurious effect on healthy cattle.

There is a popular notion that the failure of an animal to react the second time constitutes a demonstration of the inaccuracy of the test. The falsity of this becomes evident upon consideration of the facts regarding the result of a previous injection of tuberculin; of the fact that recovery may have occurred in the meantime; or that the progress of the disease may have become arrested.

When the tuberculin test first came into use it was recommended by German and French veterinarians, and others who were the pioneers in the use of tuberculin as a diagnostic agent, that the temperature of the animals be taken every two hours after the injection of tuberculin until the twenty-fourth hour. However, it has been found that a test accurate enough for all practical purposes can be made by taking the temperature twice before injection and afterwards on the eighth, tenth, twelfth, fourteenth, sixteenth and eighteenth hours. From a study of the temperature records of 253 reacting cows, made by the California Agricultural Experiment Station, in which the subsequent temperatures

were taken on the tenth, twelfth, fourteenth, sixteenth and eighteenth hours, shows that of the 253—

142 showed a rise above 103.5 degrees on or before the 10th hour—56%.

71 showed a rise above 103.5 degrees between the 10th and 12th hours—29%.

29 showed a rise above 103.5 degrees between the 12th and 14th hours—11%.

6 showed a rise above 103.5 degrees between the 14th and 16th hours—2%.

5 showed a rise above 103.5 degrees between the 16th and 18th hours—1.9%.

Of the 253 tests on the above animals the temperature records show that:

4 fell to normal before the 12th hour.

12 fell to normal before the 14th hour.

19 fell to normal before the 16th hour.

17 fell to normal before the 18th hour.

The rest remained above normal at the last temperature taken on the 18th hour. Hence if only one temperature were taken and that on the 10th hour, it would have detected only 142, or 56% of the 253. If taken at the 12th hour it would have detected but 209, or 82% of the total number. If taken at the 14th hour, it would have detected 226, or 89% of the total number. If taken at the 18th hour, it would have detected 201, or 79% of the 253.

On account of the failure of the tuberculin test to detect tuberculosis in an animal when the disease is in a period of incubation, it is probable that many tuberculous animals will successfully pass the tuberculin test, when these animals are in badly infected herds and are constantly exposed to infection. To obviate the probable introduction of animals affected with tuberculosis in its incubation stage, the San Francisco County Medical Milk Commission and the Alameda County Medical Milk Commission do not permit the dairies, producing certified milk under their supervision, to purchase any cows from herds showing ten per cent. or more of reactors. A study of the above tables will show that there has been a failure to keep out tuberculosis by the tuberculin test alone. Tuberculous animals which do not react to tuberculin, such as those in the period of incubation, or latent cases, but which develop active tuberculosis later, are frequently carriers of the virus, although bought and sold as sound tested animals. These cannot, at present, be differentiated from sound animals, therefore, all cattle coming from herds in which the disease exists, should be considered as suspicious. The sound herd is the unit to deal with.\*

As it is practically impossible in California to find dairymen with herds free from tuberculosis, who are willing to sell their animals, the only recourse would be for the producers of certified milk to raise their own calves on the milk from their own sound herds.

## BOVINE TUBERCULOSIS AND ITS RELATION TO THE PUBLIC HEALTH.

By GEO. S. BAKER, Bureau of Animal Industry.

Whatever relationship there is between tuberculosis of the bovine and the public health, exists from the fact that we are milk drinkers and meat eaters. Under our present civilization, the dairy cow plays a wonderfully important part in the development of the human family. From her living body comes the most valuable human food. Eliminate her and a substitute must be found at once or untold thousands of babies would die of starvation. The dairy cow is the most common foster-mother of the human infant. But our interest in the dairy cow is not limited to infancy. When the child reaches the age at which milk ceases to be his only food, he adds butter and cream and, later on, cheese to his dietary, while continuing the use of milk as a beverage, and this use of dairy products continues to the end of life. After the cow has exhausted her usefulness as a producer of milk and its products, she is slaughtered and served up to us as meat. Hence, it behooves us to consider very carefully whether the products so unselfishly yielded to us by the cow, and which ordinarily are so beneficial, may not under certain conditions become a menace to the health of the race. Esthetically it is not pleasant to feel that we are feeding on the products of a diseased animal, but when we realize that the animal products, milk, butter, cheese and meat, may and often do, carry the virulent, active agents of disease from the cow to us, it becomes a question of a good deal more than sentimental importance whether any of the diseases of the cow are transmissible to us. I shall endeavor to place before you such data regarding one of the diseases—tuberculosis,—common to both the bovine and human species, which, if it does not fully convince you of its transmissibility, will, I hope, prove sufficiently interesting to induce you to pursue the question further.

Tuberculosis is one of the few infectious diseases which attacks widely different species. It is the commonest disease of cattle as it is of man. In considering this question, I shall emphasize the dairy side rather than the meat, for the reason that dairy products are mostly eaten raw, while meat is nearly always more or less thoroughly cooked. Raw cow's milk is also used as the principal, if not the only food, at a period when we are most susceptible to danger.

Like man, the cow contracts tuberculosis only from some previous case of the same disease. Like man, the commonest location of tuberculosis in the cow is the lungs. On account of anatomical differences there is not the same tendency to form large cavities in the lungs, but nevertheless we do find small abscesses forming and these sooner or later open into the bronchioles. The tuberculous cow is not usually subject to paroxysms of coughing like the human, but raises the tuberculous matter into her mouth, probably in the process of regurgitation, with only an occasional cough. The cow does not spit, so when she raises pus from her lungs, she swallows it. Thus she not only is con-

\* Report of Committee on Dissemination of Bovine Tuberculosis. Proceedings of the American Veterinary Medical Association, 1910.